COTTON TOLERANCE TO DIMETHINAMID-P, S-METOLACHLOR, AND ACETOCHLOR PREEMERGENCE AND IN REPLANT SITUATIONS

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Abstract

Palmer amaranth is the number one pest of cotton in Georgia. Herbicide-resistant Palmer amaranth has changed the way weeds are managed with two mechanisms of action applied preemergence (PRE) followed by overlapping residuals applied postemergence (POST) through the season. In Georgia, 43% of cotton is produced on farms that have 1,000 acres or more in production. In the 12 to 18 d between planting/PRE applications and POST 1, growers may not have enough time to revisit each field to evaluate stand establishment. While applying POST 1, with the accompanying residual herbicide, growers will evaluate stand establishment and the need to replant. However, the presence of a residual herbicide complicates replant decisions. Therefore, experiments were conducted in 2020 in GA to evaluate cotton tolerance to dimethinamid-*P*, *S*-metolachlor, and acetochlor applied PRE, as well as cotton tolerance to the same herbicides in replant situations.

PRE studies were conducted in Moultrie and Ideal, GA. Dimethinamid-*P*, *S*-metolachlor, and acetochlor were applied at three rates (1X, 1.5X, and 2X), with 1X rates being 12.8, 16, and 32 fl oz/acre, respectively. A nontreated control was included for comparison, for a total of 10 treatments replicated four times. Herbicides were applied immediately following planting and activated within 4 days with at least 0.5" irrigation/rainfall. Data collection included visual injury, Palmer amaranth control, and annual grass control (0-100%) at both locations as well as cotton heights and stand in Moultrie only.

With the PRE applied treatments, cotton injury was highest with dimethinamid-*P* (23-46%), followed by *S*-metolachlor (16-23%), and acetochlor (1-8%) at 21 days after planting (DAP). Heights measured 29 DAP were reduced by all herbicides and rates. Acetochlor only reduced cotton height 10% compared to a reduction of 17 and 30% by *S*-metolachlor and dimethinamid-*P*, respectively. Stand loss was only significantly reduced, relative to the control, by dimethinamid-*P* (24%). Palmer amaranth control at 20 to 21 DAP was highest with dimethinamid-*P* (80-91%) and *S*-metolachlor (72-90%), less control was noted with acetochlor (51-84%). Trends in control for annual grasses were similar.

The replant study was conducted near Ty Ty, GA. The three previously mentioned herbicides were evaluated, with 1 and 2X rates utilized for each herbicide, and a 3X rate included for dimethinamid-*P*. The 1X use rates correspond to those rates previously mentioned. A control was included. Each herbicide treatment was evaluated with two replant methods: strip-tillage prior to planting or no-till planting. This resulted in a total of 16 treatments replicated four times. Herbicides were applied May 11, 2020, and cotton was planted May 22, 2020, with 2.4" of rainfall occurring between applications and planting. DP 1646 B2XF was utilized for both studies. Data collection included visual injury, cotton stand, heights, and seed cotton yield.

At 10 DAP when averaged over planting method, injury was highest with dimethinamid-*P* at a 2 and 3X rate (68-76%) and lowest with acetochlor at a 1X rate (34%). When comparing planting method, strip-tilling reduced injury 25% compared to no-till. By 31 DAP, dimethinamid-*P* at a 3X rate resulted in the highest level of injury (53%) followed by the 2X rates of dimethinamid-*P* and *S*-metolachlor (31 and 27%, respectively); injury was at its lowest with both acetochlor rates and the low rate of dimethinamid-*P* and *S*-metolachlor (≤ 16%). At 31 DAP, strip-tillage reduced injury 18% compared to no-till replanting. Stand loss was only noted with dimethinamid-*P* at the 3X rate (47%). Cotton heights, 47 DAP, were significantly reduced by the 2X rates of dimethinamid-*P* and *S*-metolachlor (13-15%), while the 3X rate of dimethinamid-*P* further reduced heights (28%). Seed cotton yield was only reduced by the 3X rate of dimethinamid-*P* (18%). Yield was also 8% less with no-till compared to strip-till when averaged over herbicide treatments. To mitigate injury from replant issues, growers would benefit from using acetochlor, receiving at least 2.4" of rainfall and waiting more than 11 days after application before planting, and then replanting by running a strip-tillage prior to planting.